Canada Alberta

FOREST RESOURCE DEVELOPMENT AGREEMENT
ENTENTE SUR LA MISE EN VALEUR DES RESSOURCES FORESTIERES

Canada Alberta

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The Canada-Alberta Forest Resource Development Agreement is a subsidiary agreement of the Canada-Alberta Economic and Regional Development Agreement, which provides coordination and cooperation between the governments of Alberta and Canada in areas of Alberta's economic development.

The Canada-Alberta Forest Resource Development Agreement is funded equally by the governments of Canada and Alberta, from April 1, 1984, to March 31, 1989.

Its primary objectives are to ensure the long-term availability of timber supplies; to optimize timber uses; and to contribute to the growth and diversification of Alberta's economy.

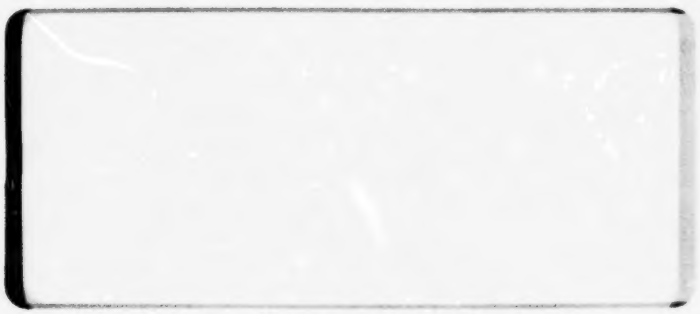
The Agreement comprises three programs: Reforestation; Applied research, technology transfer and opportunity identification; and Public information, evaluation and administration. These programs are managed by a joint Directorate and are implemented by the Canadian Forestry Service and the Alberta Forest Service.

L'Entente Canada-Alberta sur la mise en valeur des ressources forestières est auxiliaire à l'Entente Canada-Alberta sur le développement économique et régional, qui vise à assurer la coordination et la coopération des deux gouvernements relativement au développement économique de l'Alberta.

L'Entente Canada-Alberta sur la mise en valeur des ressources forestières est financée à parts égales par les gouvernements du Canada et de l'Alberta, et a cours du 1er avril 1984 au 31 mars 1989.

Ses objectifs principaux sont assurer la disponibilité à long terme de réserves de bois; optimiser leur utilisation; et contribuer à la croissance et la diversification de l'économie de la province.

L'Entente comprend trois programmes: Reboisement; Recherche appliquée, transferts de connaissances techniques et relevé des occasions; et Information, évaluation et administration. Ces programmes sont gérés par un Bureau de direction conjoint, et mis en oeuvre par le Service canadien des forêts et le Service forestier de l'Alberta.



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VALUE ADDED OPPORTUNITIES FOR ALBERTA LODGEPOLE PINE SOLID WOOD PRODUCTS

Woodland Resource Services[1]
1985

This is a joint publication of the Canadian Forestry Service and the Alberta Forest Service pursuant to the Canada-Alberta Forest Resource Development Agreement

[1]Edmonton, Alberta

DISCLAIMER

The study on which this report is based was funded under the Canada-Alberta Forest Resource Development Agreement. The views, conclusions, and recommendations are those of the authors. The exclusion of certain manufactured products does not necessarily imply disapproval nor does the mention of other products necessarily imply endorsement by the Canadian Forestry Service or the Alberta Forest Service.

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EXECUTIVE SUMMARY

- Manufacturers of furniture in Canada are seeking supplies of Lodgepole pine. Discussions with manufacturers indicate a growing demand which is being filled by imports from other countries. No statistics are available as to the total volumes required by the industry, but values of lumber components used show that the size of business in total is substantial.

- Product specifications are attainable provided sufficient care and attention is made during the production process.

- The remanufacturing plant considered in this report is designed around the capacity of the key production machine, the moulder-plant size can be reduced to minimize initial capital requirements thus allowing for future expansion funded by cash flow.

- Value added ratio is two times or more that of the cost of the raw material, depending on the specific product line.

- Markets are readily available to the remanufacturer. Potential customers contacted express a willingness to develop other product lines with the remanufacturer as the quality of the finished goods becomes established.

- Quality of finished goods and reliability of supply were the two high priority items expressed by the customer - the furniture manufacturer.

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1.0 INTRODUCTION

The availability of pine (lodgepole or jack) in Alberta represents an opportunity to manufacture "value added" solid wood products as distinct from producing "construction" type products.

Manufacturing "value added" products is in itself a meaningless exercise to the producer. What is critical is that of manufacturing to produce added profit contribution by producing items that, although they require added manufacturing costs, will also command a higher price in the market place.

This study looks at some opportunities for pine products that are in demand by the furniture industry and which are presently being supplied by imports from the United States or offshore locations.

The suggested manufacturing unit, capital and operating costs is based on a "stand alone" unit and considers that the unit would acquire rough, green sawn lumber for further processing.

2.0 CANADIAN FURNITURE INDUSTRY

2.1 Overview of the Industry

The Canadian furniture industry is a complex system consisting of many types of operations, from small type operations to highly automated operations.

Some manufacturing operations acquire rough lumber, prepare all components and produce finished articles. Other furniture manufacturers acquire components only as the raw material and essentially run a high volume assembly operation to produce finished goods.

In discussions with a number of furniture manufacturers, it is clear that the traditional species used for furniture, e.g. oak, yellow birch, white pine, etc., are becoming scarce. With a shrinking supply of those species the price is increasing to the point where species substitution is being adopted. Some furniture manufacturers specialize in pine products only and others are increasing their volumes used so that the use of the species itself is not an unknown factor.

Several manufacturers contacted made a very specific distinction between lodgepole pine and jack pine and will not accept one substituted for the other. In particular, one operation would only accept jack pine as it was felt that the machined surface finish is superior to lodgepole pine.

2.2 Furniture Manufacturing Values

Statistics Canada reports (1982 being the latest) serve to indicate the size of the industry in terms of values of products produced. Tables I, IA, II, III, and IV in the Appendix outline some of the statistics relevant to the value of solid wood products used by various segments; it should be noted that the value of panel products is excluded from the data.

In summary, four main sectors of the furniture industry show values of goods shipped and values of lumber products acquired as follows:-

	1981		1982	
	TOTAL VALUE OF SHIPMENTS $ 000	VALUE OF LUMBER USED $ 000	TOTAL VALUE OF SHIPMENTS $ 000	VALUE OF LUMBER USED $ 000
Household furniture	$1,334,659[1]	$ 589,741	$1,111,993[1]	$ 459,204
Office furniture	496,900	91,500	510,700	93,500
Miscellaneous furniture	773,366	18,233	721,562	10,724
Other wood industries	557,897	439,132[2]	503,994	385,402[2]
	$3,162,822	$1,138,606	$2,848,139	$ 948,830

N.B. [1] not identified is the wood component for items listed as upholstered furniture

[2] excludes products from wood preserving operations

The statistics contained in the Statistics Canada bulletins only partially identify softwood and hardwood lumber components. Statistics covering wood frames acquired from others do not distinguish between hardwood or softwood.

Species are not identified in any statistics kept by Statistics Canada. Discussions with the Furniture Trade Associations also reveal that no statistics are kept or reported on relative to species used by the furniture manufacturers.

However, the table indicates that the value of solid wood purchases are a substantial part of the value of shipments, approximately one-third of shipment of values.

3.0 PRODUCT SPECIFICATIONS

3.1 General Specifications

Depending on the end use of the components manufactured, specifications of each item are extremely variable. Products used for carcass work, i.e. interior, hidden from view items, have generally much less stringent specifications than those where appearance is important. However, there are some common denominators in specifications for all products.

These are:

a) Moisture Content

Two ranges of moisture content are required generally.

- 6 to 8%
- 8 to 12%

b) Knots

Products that allow knots require that the knots are tight; loose knots are unacceptable.

c) Sizes

Close tolerances of machined finish are necessary. Variations must be limited to that specified.

d) Shipments

Products must be packaged carefully to eliminate shipping damage, must be shipped on time and regularly on committed business. Products must be piece tallied by item.

e) Pricing

Contracts for the supply of components are generally long-term contracts at fixed prices for the term of the contract, twelve months being the desired term. This is in contrast to the construction lumber business of "daily auctions". As a rule, the stricter the specifications the higher the price will be for the product.

f) Surface Finish

It is extremely important that components for exterior use have a good appearance and surfacing done carefully.

3.2 Product Specifications

It was found that there are literally hundreds of different components required by the furniture industry. To list each specific component would make an extensive book in itself - beyond the time scope of this study.

Therefore, three product lines have been selected which are readily compatible with the reman plant. These products would service as a base to provide immediate returns and allow for further product lines to be developed.

Several products are identified as follows:

NOTE: Prices have all been based as F.O.B. Edmonton point.

3.1.1 Turnings

a) Size - 3/4 to 2" diameter
b) Moisture content - 6 - 8%
c) Defects - not allowed
   - knife chip outs
   - flat spots
   - open joints
   - splits and cracks
   - cross grain
   - knots or wormholes
   - limit 5% stain
   - rot or shake
d) Finger joint - minimum 1 per piece for lengths 30 inches to 70 inches.
e) Machine tolerance - no negative tolerance to plus 10 thousands of inch (0.010")
f) Smooth machine finish
g) Products bundled and wrapped with plastic for shipment, sorted to length
h) Volumes - 250,000 fbm per month and upwards
i) Prices - $700 - 750 per mfbm, F.O.B. Edmonton

3.1.2 (1) Flat Products

a) Size 7/16" x 5½"
b) Knots - must be tight, allowable to ½" width
c) Moisture content - 8 - 12%
d) Defects
   - no splits, cracks
   - no stain, rot or shake
   - no worm holes
e) Tolerance - 0 to plus 0.010 inches
f) Finish - smooth finish, no knife ripples, bullnose one edge

g) Bundled, piece tallied and complete wrap for shipping
h) Volumes - 50 to 100,000 fbm/month
i) Prices - $290 - 325 per fbm, F.O.B. Edmonton

3.1.2 (2) Flat Products

a) Size - 1½" x 1½"
b) Knots - 3/4" maximum, must be tight knots
c) Moisture content - 8 - 12% max.
d) Defects
- no splits, cracks
- no stain, rot or shake
- no worm holes
e) Tolerance - 0 to plus 0.010 inches
f) Finish - smooth four sides (S4S) no knife ripples
g) Bundled, piece tallied and complete wrap for shipping
h) Volumes - 15,000 fbm per month
i) Prices - $325 - 335 per fbm, F.O.B. Edmonton

3.1.2 (3) Flat Products

a) Size 11/16" x 3 5/8"
b) Knots - 1½" maximum must be tight knots
c) Moisture content - 8 - 12%
d) Defects
- no splits, cracks
- no stain, rot or shake
- no worm holes
e) Tolerance - 0 to plus 0.010 inches
f) Finish - smooth two sides (S2S), bullnose two edges
g) Bundled, piece tallied and complete wrap for shipping
h) Volumes - 15 to 20,000 fbm/month
i) Prices - $370 - 390 per fbm, F.O.B. Edmonton

4.0 REMANUFACTURING PLANT

4.1 Plant Description

To be successful, a remanufacturing plant must be flexible. The equipment installed should be suitable for the production of a wide range of products for several different outlets, thus lessening the plant's dependence on one customer.

One of the principal requirements of components to be manufactured is that of moisture content of the finished item.

With either the absence of dry kilns or lack of suitable kilns at sawmill operations in Alberta together with the need for strict drying procedures, it is suggested that the remanufacturer install their own kilns and acquire lumber on a rough green basis.

The principle components of the reman plant would consist of:

- dry kilns - dehumidification type
- lumber defect removal saws
- finger jointing equipment
- moulder
- resaw

4.2 Plant Capacity

The constraint in the reman plan under consideration is that of the moulding machine.

Assumptions made to estimate plant capacity are:

- moulding machine feed speed - 100' per min. maximum
- operating time per week - 44 hours
- single shift operation - 240 shifts per year
- operating efficiency - 95%
- consider three items: one round stock, two flat stock

The plant capacity is therefore based on this restraint and other facilities designed around it.

4.2.1 Moulder Thruput

a) Round stock uses a nominal 2 x 6 input; feed speed for fine surface finish is 60 fbm, annual volume required is approx. 3,000,000 thruput

$\therefore$ 60 fbm @ 95% = 57 fbm net time @ 1 fbm/min.

∴ weekly production = 57 x 1 x 44 x 60 = 150,480 fbm

20 weeks production = 3,009,600 fbm

b) Flat stock

i) for nominal 1 x 4 input, feed speed for fine finish is 90 fbm

∴ 90 fbm @ 95% = 95.5 net @ 1/3 fbm/min.

∴ weekly production = 85.5 x 1/3 x 44 x 60 = 75,240 fbm

15 weeks production = 1,128,600 fbm

ii) for normal 1 x 6 input, feed speed for fine finish is 90 fbm

∴ 90 fbm @ 95% = 86.6 fbm net 1/2 fbm/min.

∴ weekly production = 85.5 x ½ x 44 x 60 = 112,860 fbm

15 weeks production = 1,692,900 fbm

Total annual production equivalent = 5,831,100 fbm

4.2.2 Kiln Capacity

The volumes processed through the moulder area after defect removal, volumes dried must account for that volume rejected. Assumptions made on the percentage of defect are as follows:

for round stock 20%

for flat stock 10%

Therefore, the rough green lumber to be dried would be:

1) round stock 3,009,600 fbm plus 20% = 3,611,520 fbm
2) flat stock 2,821,500 fbm plus 10% = 3,103,650 fbm

Drying schedules will be different between the two product lines as round stock will be manufactured from nominal 6/4 material, the flat stock will be manufactured for 4/4 material.

Assumptions made for calculating drying schedules are:

1) for round stock

green moisture content 45% - 55%
dry moisture content 6% - 8%
drying time - 10 days - 240 hours

2) for flat stock

green moisture content 45% - 55%
dry moisture content 8% - 12%
drying time - 6 days - 144 hours

Dry kilns would run continuously on a year round basis except for loading/unloading times. Because of different drying schedules, two kilns should be installed. Required capacity of the kiln for round stock is:

available hours/year
365 x 24 x 95% operating time = 8,322 hours
∴ charges/year = 34.6
∴ kiln capacity required = 105,000 fbm

Required capacity of the kiln for flat stock is:

available hours/year = 8,322
∴ charges/year = 58
∴ kiln capacity required = 54,000 fbm

4.3 Capital Cost Estimate

Assume buildings and land are leased, no capital improvements being required.

ITEM	DESCRIPTION	H.P.	EQUIPMENT COST
1.	Tilt Hoist	10	$ 5,000
2.	Infeed Table	5	5,000
3.	Defect saws & conveyors	25	10,000
4.	Finger Jointer	30	60,000
5.	Cooling table	5	5,000
6.	Planer moulder	75	60,000
7.	Hola defect saws	30	15,000
	Sorting/grading	5	8,000
8.	Dry kilns - equipment	150	200,000
	Dry kilns - equipment	-	40,000
9.	Resaw	100	80,000
	Knife grinding equipment	15	15,000
	Tools, maintenance	-	10,000
	Forklift	-	40,000
	Dust collection system	50	30,000
	Control equipment		10,000
	Office equipment		10,000
	Moulder heads		5,000
		510	608,000
	Electrical installation		55,000
	Mechanical installation		60,000
	Engineering/permits/etc.		60,000
			783,000
	Contingency		50,000
			$833,000

4.4 Labour Requirements

Based on single shift operation per day.

		WAGE SCALE
Operating Labour		
Lumber strippers	2	1
Dry kiln/lbr receive/ship	2	1
Defect saw operator	1	2
Finger Jointer	1	2
Planer/moulder	1	2
Defect trim	1	2
Grader/sorters	3	1
Resawyer	1	2
Millwright	1	3
Knife grinder/set-up	1	3
Packager	2	1
General Labourer	1	1
Allow for casual for year total equals	1	1
	18	
Administration		
General Manager	1	
Operations Supervisor	1	
Office Administrator	2	
	4	
TOTAL	22	

4.5 Operating Cost Estimates

Annual shipable volume equivalent 5,831,100 fbm

			COST/ MFBM
Direct Labour			
11 @ scale 1 @ 8.00/hr x 2220 =		$195,360	
5 @ scale 2 @ 9.00/hr x 2220 =		99,900	
2 @ scale 3 @ 11.00/hr x 2220 =		48,840	
		344,100	
Payroll loading 17%		58,497	
Total		$402,597	$ 69.04
Electricity			
Power	24,000		
Heat for kiln	60,000		
	$84,000	$ 84,000	$ 14.40
Maintenance supplies	40,000		
Operating supplies	20,000		
Shipping materials	10,000		
Kiln sticks	10,000		
Mobile Equipment	10,000	$ 90,000	$ 15,43
		$576,597	$ 98.88
Overhead			
Rent building 30,000 sq.ft. and land @ $3.00		90,000	
Insurance		10,000	
Utilities		5,000	
Telephone/telex		5,000	
Legal/audit		15,000	
Travel		25,000	
Office supplies		5,000	
Salaries		140,000	
Salaries benefit 17%		23,800	
Business Promotion		10,000	
Miscellaneous		10,000	$338,800 $5.00

4.6 Raw Material Costs

The assumption made in this analysis is that the remanufacturing plant will be located in or near Edmonton. Costs of raw material were obtained from several sawmill operations and freight allowed to the site.

It was found in discussions with several sawmill operators, that material suitable for flat stock - 1" boards were a recovery item, and would prefer to sell on a rough basis rather than incur the relatively high cost of drying and finishing through their own plant which is designed for finishing high volume commodity items.

On average, prices for rough green 1" boards ranged from $120.00 to $160 per fbm. For thicker material for production of round stock, prices ranged from $140.00 to $180.00 per fbm.

A critical factor to the remanufacturer is the quality of the raw material supplied. Estimates used to calculate volumes of raw material assume a 20% loss for round stock production and 10% for flat stock production. Variables to these assumptions means either an increase or decrease in manufacturing costs and can be extremely significant.

5.0 MARKETING

Marketing methods for components differ from that of construction lumber products in that the component supplier can arrange long term commitments from the customer, the furniture manufacturer, rather than the "daily auction" type business of the construction lumber industry.

The remanufacturer can identify the items best suited for the species and plant facilities available and make commitments to the customer and deal directly with the customer. It is not necessary to deal with a number of wholesalers/distributors retailers and customers as is the case of construction lumber producers, although there are wholesalers who specialize in specific items such as components and who, in effect, are buyers for a number of end users. Some larger furniture manufacturers retain their own buying staff whose sole function is to source the components direct from the manufacturers.

From the manufacturers point of view, marketing activity has to be centered on determining suitable product lines, to provide a diversified customer base and diversified product lines to avoid single dependency on one customer.

One marketing strategy that should be considered is that of a cooperative venture, whereby several small volume remanufacturers can use one source marketing arrangements. For example, three or four remanufacturers producing one million fbm each would share the burden of the cost of sales without loss of independence.

Discussions with furniture manufacturers reveal that the key to succession of markets by the supplier is price, quality and reliability of supply and necessarily in that order.

APPENDICES

TABLE I

HOUSEHOLD FURNITURE MANUFACTURE

Reported Value of shipments of goods of own manufacture
000 $

YEAR	THOUSAND PERSON HRS.	TOTAL VALUE OF SHIPMENTS	VALUE $ PER MAN HOUR	LUMBER USED ROUGH AND PLANED SOFTWOOD	LUMBER USED ROUGH AND PLANED HARDWOOD	BLOCKS SQUARES BLANKS	FRAMES PURCHASED FOR FINISHING
1974	51,638	711,455	13.77				
1975	49,475	695,436	14.05				
1976	48,886	770,123	15.75				
1977	43,538	759,439	17.44		NOT AVAILABLE		
1978	45,922	887,615	19.33				
1979	53,335	1,083,395	20.31				
1980	48,406	1,164,210	24.05				
1981	48,999	1,334,659	27.23	24,782	59,908	9,510	39,216
1982	40,274	1,111,883	27.60	20,342	46,090	4,181	33,893

TABLE IA

TYPES OF PRODUCTS

Wooden Household Furniture	1981	1982
Complete bedroom suites	213,191	155,029
Wooden Beds	3,114	1,454
Other Bedroom Furniture	7,241	2,468
Modular Storage Units	15,752	20,873
Wooden Living Room Furniture (not upholstered)	106,101	70,306
Wooden Dining Room Furniture	131,936	96,364
Wooden Kitchen Furniture	10,106	10,704
Occasional Furniture	3,473	3,423
Wooden children's Furniture	14,982	13,960
Cabinets (TV, Radio)	16,037	12,665
All Other Household Furniture	52,996	60,600
	587,149	459,204
Desks	6,003	4,260
Other	5,888	1,877
	11,891	5,137
Wood Furniture Components	32,379	27,508
TOTAL	631,419	491,849

Source: Statistics Canada 35,216, 1982

[1] Value of shipments includes wood and metal furniture

TABLE II

OFFICE FURNITURE MANUFACTURE

YEAR	TOTAL VALUE OF SHIPMENTS OF OWN MANUFACTURE	VALUE OF WOODEN DESKS AND WOODEN CHAIRS	LUMBER USED ROUGH AND PLANED		WOODEN FRAMES PURCHASED
			SOFTWOOD	HARDWOOD	
1978	246,800	52,600			
1979	310,000	61,200		NOT AVAILABLE	
1980	394,000	81,400			
1981	496,900	91,500	4,001	8,701	3,855
1982	510,700	93,500	5,224	8,612	4,262

Source: Statistics Canada 35 216, 1982

TABLE III

MISCELLANEOUS FURNITURE AND FIXTURES

Goods of own manufacture
(e.g. store furniture, hotel, restaurant, hospital furniture)

YEAR	TOTAL VALUE OF SHIPMENTS	LUMBER USED[1] SOFTWOOD	LUMBER USED[1] HARDWOOD	BLOCKS BLANKS	FRAMES PURCHASED
1974	367,797				
1975	493,033				
1976	410,476				
1977	392,296				
1978	457,163				
1979	537,224		NOT AVAILABLE		
1980	610,517				
1981	773,366	11,042	12,061	480	8,550
1982	721,562	10,772	10,714	71	7,295

[1] Excludes exotic species

Source: Statistics Canada 35.208

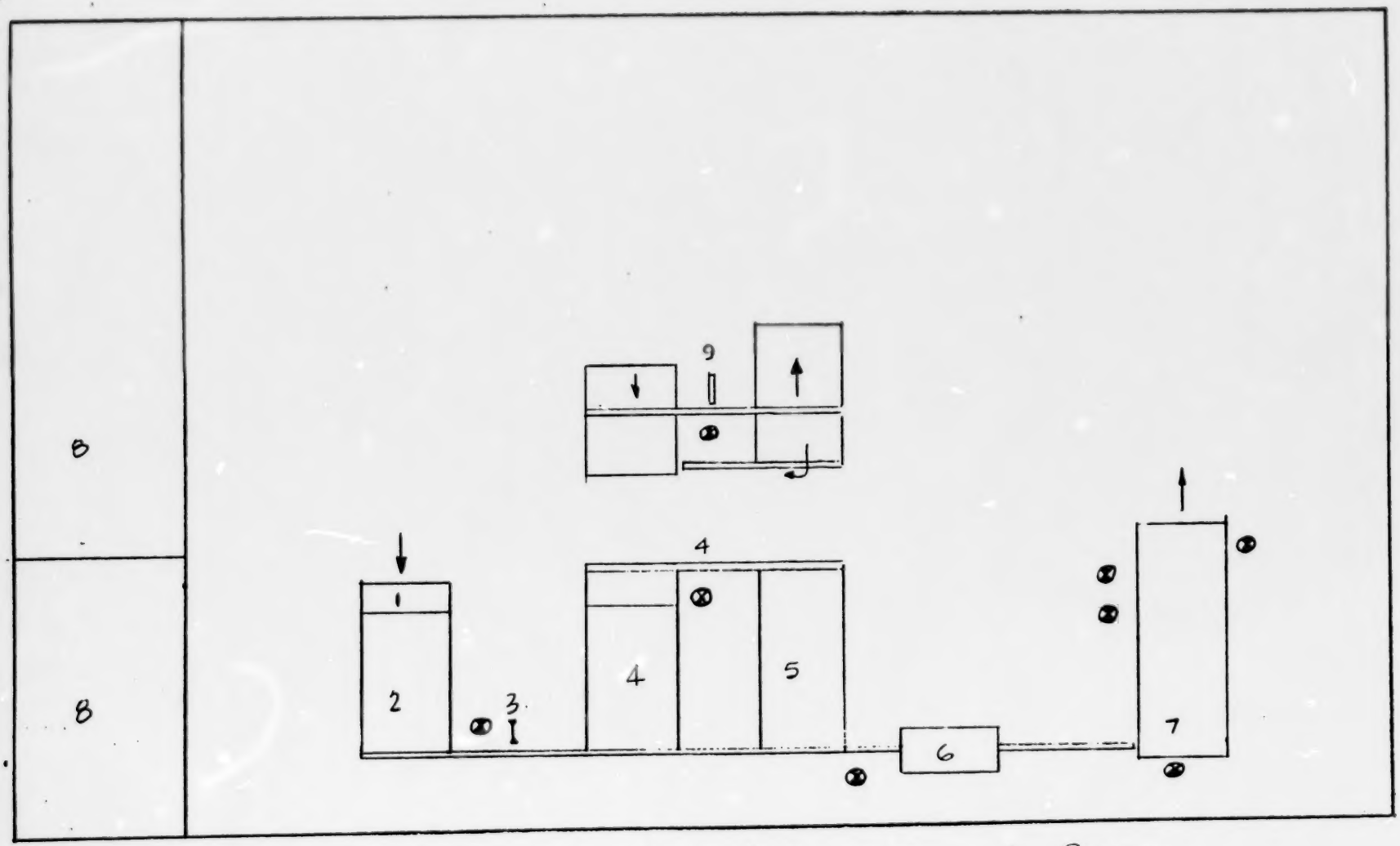
TABLE IV

MISCELLANEOUS EXCLUDING MATERIAL FOR TREATMENT PRESERVATION

Woodhandles, turnings, cooperage

YEAR	VALUE OF SHIPMENTS OF OWN MANUFACTURE	LUMBER USED MFBM		VALUE 000 S	
		SOFTWOOD	HARDWOOD	SOFTWOOD	HARDWOOD
1974	217,625				
1975	222,174				
1976	238,698				
1977	282,122		NOT AVAILABLE		
1978	351,226				
1979	435,586				
1980	481,476				
1981	557,897	135,923	43,419	37,787	14,576
1982	503,994	169,224	27,318	40,504	8,568

DRAWING



LEGEND

1 - TILT HOIST
2 - INFEED TABLE
3 - DEFECT SAW
4 - FINGER JOINTING
5 - COOLING TABLE
6 - PLANER MOULDER
7 - HULA DEFECT TRIM & SORT
8 - DRY KILNS
9 RESAW
⊗ OPERATOR STATIONS

REMANUFACTURING PLANT